EVI-3 PEA Overview

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Outline

1. Overview of the *Earth Venture Instrument-3* (EVI-3) PEA of the *SALMON-2 AO*.

2. Discuss the proposal requirements and the differences between EVI-3 and EVI-2.

3. Describe the evaluation process

4. Point to documents from EVI-2 and EVI-3 for reference in our library.

NASA Earth Sciences context

Earth Science Focus Areas

The *2014 Science Mission Directorate Science Plan* is available through the EVI-3 Library and can also be found at http://science.nasa.gov/about-us/science-strategy/.

The NASA Earth science research program strives to advance earth system science and has goals in the following six *Science Focus Areas* and *Applied Sciences* as well as interdisciplinary programs:

- Atmospheric Composition
- Weather
- Carbon Cycle & Ecosystems
- Water & Energy Cycle
- Climate Variability & Change
- Earth Surface & Interior
- Further the use of earth system science research to inform decisions and provide benefits to society

The focus areas and their main aims are articulated in the *2014 Science Plan*.

EVI-3 PEA: Key Info (1)

Science Scope is broad

- EVI-3 solicitation will be an open call to address science from any of the Earth Science Focus Areas
- Venture class is not intended to be a mechanism for accelerating the implementation of Decadal Survey missions; however,
- Missions whose objectives overlap those of Decadal Survey missions may be proposed, assuming they meet other criteria in terms of science, innovation, schedule, and cost.

Solicits Instrument and CubeSat Investigations that should be *complete investigations*, including science.

Partnerships are encouraged, however the stability & reliability of the partnership will be considered as a risk element in the proposal

EVI-3 PEA: Key Info (2)

- PI-managed investigations with NASA Life Cycle Cost Caps as follows:
  - The proposed PI-Managed Mission Cost shall be no more than $97M for Class C instrument or $31M for Class D instrument or CubeSat based investigations in FY 2018 dollars.
  - The PI-Managed Mission Cost excludes the integration of the instrument to the selected platform or the integration of the CubeSat(s) to the selected launch vehicle but includes proposed science activity in Phase D and all of Phases E and F.

- Life Cycle Schedule
  - Delivery of Class C Instrument (end of Phase C) by March 31, 2021.
  - Delivery of Class D Instrument (end of Phase C) by March 31, 2020.
  - Delivery of CubeSat(s) (into Phase D) by March 31, 2020.

- Access to Space
  - NASA will arrange and specify access to space.
  - Proposals should discuss appropriate orbits and accommodation requirements for the proposed investigations.
  - Proposals may include information on any research the proposing team has done relative to potential hosting platforms. This is not a requirement for any proposal.

- Single-Step Evaluation & Selection Process

EVI-3 PEA: Budgets

Reminder: What is included in the PI-Managed Mission Cost?

- Cost of the Instrument (Phases A-C) and/or CubeSat(s) (Phases A-C and part of Phase D)
- Science Team support, Algorithm Development, Calibration & Validation
- Key management and engineering staff during Phase D (Project Manager, Instrument Manager, Systems Engineer, etc.) assuming a 2 year Phase D
- Postlaunch instrument commissioning activity (within Phase D)
- Phase E & F – e.g., Operation & Ground processing, Data Analysis & proposed data product generation
- Any Student Collaboration cost above 1% of the PI-Managed Mission Cost

What is not part of PI-Managed Mission Cost, yet required in proposal?

- Investigation Costs during a potential gap between completion of instrument or CubeSat(s) and start of integration (planning budget up to 4 years, on a per-year basis for Instruments and planning budget up to 2 years, on a per-year basis for CubeSat(s))
- Integration and test to selected platform (within Phase D) (planning budget nominally 2 years for Instruments and 1 year for CubeSats)

EVI-3 PEA: Risk Class, Data, Non-US cont, Edu&Comm

- Risk Classifications are Mission Category 3 (<$250M, low priority), Payload Class C or Class D (see cost limits)

- Standard NASA Earth Science Data Policy for Mission data, no period of exclusive use

- Complementary Data - Each proposal shall clearly outline which ongoing or planned set of observations (outside the proposed mission), if any, are required for the proposed investigation to achieve its baseline mission science investigation. The proposal shall describe how the high-level science requirements will be impacted if such observations do not exist when the proposed investigation is in operations.

- No limit on non-NASA or non-US contributions
    - Contributions to the investigation (part of hardware and/or investigators) on a no-exchange-of-funds basis is permitted with no cost limitations.
    - Enabling partnerships are encouraged, however the stability & reliability of the partnership will be considered as a risk element in the proposal

- Education and Communications Programs are <u>not required</u>. A communication program may be required, pending further NASA guidance for communication policy, and those costs will be outside the PI-Managed Mission Cost cap.

EVI-3 PEA: Schedule

Solicitation Schedule

EVI-3 PEA Release **March 26, 2015**

EVI-3 Preproposal Workshop* **April 14, 2015**

*via Webex; see the EVI-3 Acquisition Homepage at http://essp.larc.nasa.gov/EVI-3/ for date, agenda, and logistical information

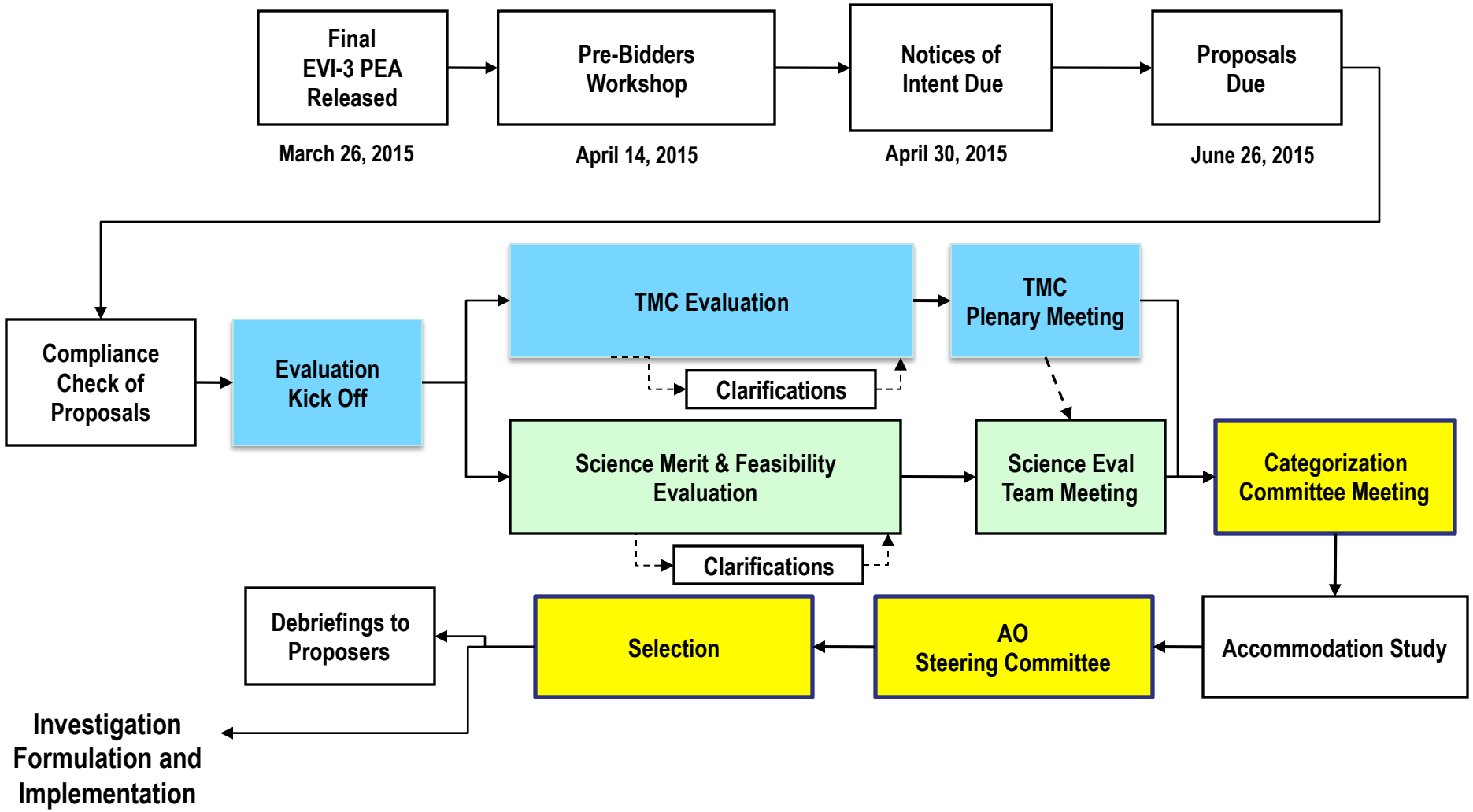
EVI-3 Notices of Intent Due* **April 30, 2015**

*Required and must include all PI, Co-Is and collaborators to facilitate planning for review process.

EVI-3 End of Q&A Period **June 12, 2015**

EVI-3 Proposals Due **June 26, 2015**

Proposal Evaluation Process



EVI-3 PEA: Evaluation and Clarifications

Evaluation criteria reminder from 7.2 of SALMON-2 AO

- Intrinsic Science Merit of the Proposed Investigation ~ 40%
- Experiment Science Implementation Merit and Feasibility of the Investigation ~30%
- Technical, Management, and Cost (TMC) Feasibility of the Investigation Implementation, including Cost Risk ~ 30%.

Clarifications reminder from 7.1 of SALMON-2 AO

- Proposers should be aware that, during the evaluation and selection process, NASA may request clarification of specific points in a proposal… A typical limited response is to direct NASA's attention to pertinent parts of the proposal without providing further elaboration.

Programmatic Assessment

NASA will take the following steps before making a recommendation for selection to Steering Committee (Section 7 of SALMON-2 AO):

- Hold Categorization Committee meeting to rank proposals from Category 1 (recommended for selection) to Category 4 (not recommended for selection).

- Of those ranked at Category 1 or 2; NASA will:
  - Conduct an internal assessment on the likelihood that NASA will be able identify and arrange an appropriate platform for the proposed investigation.
  - Assess the extent to which the proposed science investigation addresses unique science areas that are not being addressed by (or significantly enhance) other missions (both NASA and non-NASA missions) expected to be in operation 5 to 10 years from the start of the proposed investigation.
  - Assess the proposed funding profile relative to NASA's planned budgets to determine whether NASA can commit to the funding needs of the investigation.

Key differences between the EVI-3 and EVI-2 solicitations

- Use the change table as a guide: http://essp.larc.nasa.gov/EVI-3/pdf_files/EVI-3_Table_of_Updates.pdf
- Note that EVI-3 solicitation is final

EVI-3 PEA: NASA Plans and context

The 2014 NASA Strategic Plan and 2014 SMD Science Plans

The 2014 NASA Strategic Plan is available through the EVI-3 Library and can also be found at http://www.nasa.gov/sites/default/files/files/FY2014_NASA_SP_508c.pdf. One of NASA's strategic goals is to "Advance understanding of Earth and develop technologies to improve the quality of life on our home planet"

The *2014 Science Mission Directorate Science Plan* is available through the EVI-3 Library and can also be found at http://science.nasa.gov/about-us/science-strategy/

EVI-3 PEA: Cost cap and accounting

4.4.1 Cost Requirements and Constraints

The PI-Managed Mission Cost Cap for an Earth Venture Instrument investigation depends on the instrument class as described in Sections 4.4.1 and 4.5.5 of this PEA. For Class D instrument based investigations or for CubeSat based investigations, the cost cap is $31M in (FY) 2018 dollars. For Class C instrument based investigations, the cost cap is $97M in (FY) 2018 dollars.

NASA expects to select some combination of Class C and Class D investigations based on funding availability at the time of selection, assuming all such investigations are deemed selectable.

4.4. Full Cost Accounting for NASA Facilities and Personnel

Please refer to full text of PEA.

EVI-3 PEA: Investigation Schedule

4.4.3 Schedule Requirements and Constraints

Requirement P-17. For Class C instrument investigations, proposals shall include a development schedule that delivers an instrument for integration onto the selected platform no later than March 31, 2021. For Class D instrument or CubeSat investigations, proposals shall include a development schedule that delivers an instrument for integration onto the selected platform and/or a CubeSat(s) that can be integrated to a launch vehicle no later than March 31, 2020.

4.5.2 Instrument Investigation Science Instrument System and Platform Interfaces

Even though NASA has current plans to support ISS operations through 2024, any instrument investigation that is only appropriate for the ISS should describe an adequate timeline of development and operation for the proposed investigation, regardless of whether it is completed by the end of 2024. Differences between the investigation's timeline and NASA's plans for future ISS operations will be factored into the proposal's risk assessment for selection.

EVI-3 PEA: TRL

- **The EVI-3 PEA clarifies the language regarding expected TRL levels.**
- **See the table of changes for further details.**

4.5.1 New Technologies/Advanced Engineering Developments

This section intends to clarify the requirement for New Technologies and/or Advanced Engineering Developments and supersedes Section 5.3.4 of the SALMON-2 AO.

This EVI-3 PEA solicits flight missions, not technology or advanced engineering development projects. Proposed investigations are generally expected to have mature technologies, with systems at a Technology Readiness Level (TRL) of 6 or higher. **For the purpose of TRL assessment, systems are defined as level 3 WBS payload developments (i.e., individual instruments) and level 3 WBS spacecraft elements (e.g., electrical power system); see Figure 3-7 of the *NASA WBS Handbook*, NASA/SP-2010-3404**, which can be found in the EVI-3 Library. TRLs are defined in NPR 7123.1B *NASA Systems Engineering Processes and Requirements*, Appendix E, which can be found in the EVI-3 Library.

Proposals with a limited number of less mature technologies and/or advanced engineering developments are permitted as long as they contain a plan for maturing systems to TRL 6 (see NASA/SP-2007-6105 Rev 1, *NASA Systems Engineering Handbook*) by no later than PDR and adequate backup plans that will provide mitigation in the event that the systems cannot be matured as planned. The TRL state of systems may be validated by an independent team at PDR.

Requirement P18. Proposals that use systems currently at less than TRL 6 shall include a plan for system maturation to TRL 6 by no later than PDR and a backup plan in the event that the proposed systems cannot be matured as planned (see Section 5.1 of this PEA, for additional detail).

EVI-3 PEA: CubeSats

- **The EVI-3 PEA was updated to include CubeSats up to 6U**

4.5.3 CubeSat Investigations

CubeSat proposals are recommended to comply with Cal Poly CubeSat Developer's specifications, found at http://cubesat.calpoly.edu/index.php/documents/developers. Concepts that do not comply with the Cal Poly CubeSat and Poly Picosat Orbital Deployer (P-POD) standards should clearly describe how their designs are packaged and deployed. NASA Launch Services Program has issued a *Program Level Dispenser and CubeSat Requirements Document* with requirements for CubeSats sized up to 6U (2U x 3U). All proposals for CubeSats sized up to 6U shall be compliant with these requirements. Both of these documents can also be found in the EVI-3 Library. No CubeSat form factors larger than 6U will be considered under the present call. Qualifying CubeSat form factors (size) include 1U, 1.5U, 2U, 3U and 6U with a mass not to exceed 1.33 kg per U.

Requirement P-20. All proposals involving sizes 1U through 6U CubeSats shall be compliant with the requirements in the NASA Launch Services Program *Program Level Dispenser and CubeSat Requirements Document*. No CubeSat form factors larger than 6U will be considered under the present call. Qualifying CubeSat form factors (size) include 1U, 1.5U, 2U, 3U and 6U with a mass not to exceed 1.33 kg per U.

EVI-3 PEA: Data Policy

- **The EVI-3 PEA data policy was changed to use the DAAC for data archive and distribution.**

4.5.7 NASA Earth Science Data Policy

4.5.7.1 Data Analysis

The PI will be responsible for production and analysis of the mission data necessary to achieve the proposed science objectives, delivery of products to NASA selected Distributed Active Archive Centers (DAAC), and for timely publication of initial scientific results in refereed scientific journals, as part of their mission operations (Phase E) or post-mission activities. **The assigned NASA DAAC(s) will be responsible for archival and public distribution of all data collected by the instrument(s) and produced by the investigations prime measurement phase**. The PI is required to work with the DAAC to ensure that the mission data is delivered in a format that meets NASA requirements. **The NASA DAAC will not levy any additional cost for its services to the PI, therefore this cost is not to be included as part of the PI Managed Mission Cost.** Science studies with the archived data sets beyond the science investigations proposed by PI-led team will be solicited and selected by NASA in subsequent NASA solicitations through the Research Opportunities in Space and Earth Sciences (ROSES) NASA Research Announcement.

Requirement P-24. Proposals shall clearly identify the standard products from the investigation and describe the complete data processing flow leading to archived data products, including the time required to complete the initial and final on-orbit calibration and validation of the measurements. **Proposal shall show adequate resources for delivering data products to the assigned NASA DAAC**.

EVI-3 PEA: Export Control

5.1 Proposal Content Requirements

The key data associated with the electronic submission of proposals (see Section 6.2 of the SALMON-2 AO) includes questions indicating whether or not a proposal contains export-controlled information (see Sections 5.9.4 and 5.10.2 of the SALMON-2 AO). All proposers must answer these questions YES or NO when completing the electronic submission; these questions shall not be left unanswered.

All proposals must identify any export-controlled material in the proposal as instructed in Sections 5.9.4 and 5.10.2 of the SALMON-2 AO. To the extent possible, ITAR sensitive material should be organized into separate clearly marked sections.

Requirement P-29. All proposals must identify any export-controlled material in the proposal as instructed in Sections 5.9.4 and 5.10.2 of the SALMON-2 AO.

EVI-3 PEA: Education&Communication

- **An Education and Outreach program is not required for this PEA.**

4.6 SALMON-2 Required Specifications for PEAs

Education and Communications (E&C) - Section 5.7.1 of the SALMON-2 AO states that the PEA will specify whether an Education or Communication (previous E/PO) program that is consistent with SMD policy is required. This PEA states that an Education program is not required.

A Communication program may be required, pending further NASA guidance for Communication policy, and those costs will be outside the PI-managed cap.

Section 5.7.2 of the SALMON-2 AO states that the PEA may state that proposals may define a Student Collaboration (SC) that is a separate part of the proposed investigation. This PEA so states, and Requirements 71 and 72 of the SALMON-2 AO apply to this PEA

EVI-3 PEA: Miscellaneous

2.3 NASA Management of the Earth Venture Program

The Earth System Science Pathfinder (ESSP) Program Office will manage the EVI investigations under the requirements of NPR 7120.5E, *NASA Space Flight Program and Project Management Requirements.*

4.1 Eligibility to Propose

Refer to Section 4.2 of the SALMON-2 AO for the rules on participation policy. For this particular PEA, NASA will place full or partial limitations (as described in the SALMON-2 AO) on organizations that will be involved in the evaluation process.

- Cornell Technical Services LLC (CTS) is subject to the "Full Limitation" as described in Section 4.2.1 of the SALMON-2 AO.
- There is no limitation on The Aerospace Corporation for EVI-3.

Links and Reference materials

EVI-3 PEA

The EVI-3 PEA will be accessed from the NSPIRES Website at http://nspires.nasaprs.com/ and the EVI-3 Acquisition Homepage at http://essp.larc.nasa.gov/EVI-3/

Other reference documents

Available on the EVI-3 Library at
http://essp.larc.nasa.gov/EVI-3/evi-3_library.html

Review Process, Selection Criteria and other information

For detailed information on these matters refer to presentations from the EVI-2 Preproposal Workshop available at
http://essp.larc.nasa.gov/EVI-2/evi-2_prepropwebex.html

Questions

Questions and Comments

All questions pertaining to the EVI-3 PEA MUST be addressed to:

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Preferably by email at:

thomas.wagner@nasa.gov
Subject line to read "EVI-3 PEA"